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JOURNAL OF

THE NEW ENGLAND BOTANICAL CLUB

Vol. 17. September, 1915. No. 201.

THE AMERICAN OSTRICH FERN.

M. L. Fernald.

The Ostrich Fern of eastern North America is commonly treated as identical with the Eurasian species; and, although long kept with *Onoclea* as *O. Struthiopteris* (L.) Hoffm., it is now recognized by the leading students of ferns as constituting, with a few other species, a distinct genus *Matteuccia* Todaro (1866). For a long time those who maintained the Ostrich Ferns as generically distinct from *Onoclea* placed them under *Struthiopteris* Willd. (1809) but the earlier valid use of the name *Struthiopteris* by Weiss in 1770 for the genus which has been generally called *Lomaria* Willd. (1809) necessitates the abandonment of the generic name *Struthiopteris* for our "Ostrich Ferns." The uniting of the American Ostrich Fern with the European under the names *Onoclea Struthiopteris* (L.) Hoffm., *Struthiopteris germanica* Willd. or *Matteuccia Struthiopteris* (L.) Todaro has of late been so general and so entirely unquestioned that one wonders whether European students of the ferns can have much familiarity with the American plants or American students with the European material.

By the older students of our flora the plants were not considered conspecific, while by some of a later generation they have been treated as varietally distinct. The first to distinguish the American plant was Michaux who, in 1803, described the American Ostrich Fern from material collected at Montreal as *Onoclea nodulosa:* "O. pinnis sessilibus, linearibus, pinnatifidis: fronde fertili pinnis quasi nodulosoarticulatis; urceolis contiguis";[1] but most unfortunately Michaux appended to this very clear description the synonyms *Acrostichum*

[1] Michx. Fl. Bor. Am. ii. 272 (1803).

areolatum Linn. and *Osmunda caroliniana* Walt. and the "*Hab.* in Carolinae limosis umbrosis." The synonymy and locality belong, then, clearly to *Woodwardia areolata* (L.) Moore, the description and the type material to the Canadian *Matteuccia.* But in interpreting Michaux's species the important weight should naturally be given the description and the type-material rather than the cited synonyms and locality, which do not accord with the description or with the plant described, especially since the name of the plant described was not derived from either of the supposed synonyms. In 1809 Schkuhr [1] beautifully illustrated some of the differences between the American *Onoclea nodulosa* and the Old World *O. Struthiopteris,* and it has been customary to cite Schkuhr's *O. nodulosa* as different from that of Michaux which most students, following the synonymy rather than the description, have generally referred to *Woodwardia areolata;* but, as indicated above, Michaux's plant is identical with Schkuhr's. The fact that Michaux's type-material and the synonyms cited belonged to different plants was clearly recognized by Desvaux, who took up the Michaux plant as *Struthiopteris nodulosa,* based on "Onoclea nodulosa MICH., *Fl. Am. bor.,* 2, p. 272. *Excl. syn.* SCHK., *Fil.* t. 104." [2]

In 1810, Willdenow, recognizing in the American plant a species distinct from his European *Struthiopteris germanica,* called it *S. pensylvanica,*[3] and under this name the American plant was maintained as a distinct species by Nuttall, Torrey (in his *Compendium*), and other early discriminating students of our flora. Subsequently, however, the American and the European plants have been generally treated as identical, though in 1862 Lowe treated the American plant as *Struthiopteris germanica,* var. *pensylvanica.*[4]

A comparison of a series of European specimens with the American material indicates that the earlier students of our flora were apparently correct in their interpretation of the American and the European plants as distinct species. In *Matteuccia Struthiopteris* of Europe the fertile frond has subentire or merely undulate pinnae. These are well illustrated by Schkuhr (Krypt. Gew. i. t. 105), by Hooker & Bauer (Gen. Fil. t. 69 A), by Britten (Eur. Ferns), by Ettingshausen & Pokorny (Physiotypia Pl. Austr. i. t. 14), and by Thomé (Fl. von

[1] Schkuhr, Krypt. Gew. i. 96, 97, tt. 104, 105 (1809).
[2] Desv. Mém. Soc. Linn. Paris, vi. pt. 2, 287 (1827).
[3] Willd. Sp. v. 289 (1810).
[4] Lowe, Ferns, Brit. and Exot. ii. 138 (1862).

Deutschl. i. t. 24); and they are indicated by the phrase of Ledebour and of Koch: "pinnis linearibus integris."[1] In the American plant the fertile pinnae are commonly pinnatifid or, as originally expressed by Michaux, "quasi noduloso-articulatis." This character, well shown in fairly mature specimens, is also indicated in the illustrations in Schkuhr's *Kryptogamische Gewächse*, i. t. 104.

In all the European material examined the stipe (especially the base) of the fertile frond bears closely appressed firm lustrous blackish scales, and these scales are apparently found on the stipes of the sterile fronds as well. Such sterile fronds as the writer has seen have been cut above the base, but in his detailed account of the plant Mr. James Britten says: "The petiole is short, and is dilated at the base, where it joins the stem, and there covered with nearly black scales."[2] The writer has closely examined more than 100 numbers of the American plant, mostly showing the base of the stipe, and in no case has he been able to find any of the appressed black scales which characterize the base of the stipe in the European. He has also failed to find black scales on the fresh material. Instead the American plant has the base of the stipe covered with very thin membranous pale brown or cinnamon-colored scales.

The sterile frond of the European plant is broadly oblong to oblong-lanceolate and comparatively thin in texture; that of the American plant more elongate and of firmer texture, the margins of the pinnules often revolute. In the European the pinnae are nearly horizontal, in the American commonly more obliquely ascending; and the American plant is more erect and of greater stature than the European. Thus, Moore, describing the European plant, speaks of the sterile fronds as "reclining at an angle of about 50°,"[3] and Britten speaks of them as "elegantly curved outwards,"[4] and Moore recognized his *Struthiopteris germanica*, var. *pensylvanica* because it "is more erect in habit." As to stature, Britten says of the sterile fronds of the European plant, "sometimes attaining a length of as much as five feet, though usually about three feet" and "the main pinnae are four or five inches long"; while Ascherson & Graebner, going into more detail, say that the frond is "up to 1.7 m. long" and that its stipe is "up to 12 cm.

[1] Ledeb. Fl. Ross. iv. 527 (1852–53); Koch, Fl. Germ. ed. 3, 739 (1857).
[2] Britten, Eur. Ferns, 2 (1881).
[3] Moore, Ferns Brit. and Exot. ii. 138 (1862).
[4] Britten, Eur. Ferns, 2 (1881).

long."[1] In the American plant, on the other hand, fronds only 3 feet long would be considered small, those of 5 or 6 feet in length being common, while luxuriant fronds are said to exceed 10 feet (3 m.). The pinnae of the American plant vary, according to luxuriance, from 2–7 inches (5–18 cm.) in length, and the stipe of the sterile frond from $2\frac{3}{4}$–14 inches (7–35.5 cm.) in length.

Departing from the European *Matteuccia Struthiopteris* in nearly all details and quite isolated from it, the North American plant seems to be, as treated by the earlier students of our flora, a distinct American species which should be called

MATTEUCCIA **nodulosa** (Michx.), n. comb. *Onoclea nodulosa* Michx. Fl. Bor. Am. ii. 272 (1803) as to description and type-specimen, not as to synonyms and habitat; Schkuhr, Krypt. Gew. i. 96, t. 104 (1809). *Struthiopteris pensylvanica* Willd. Sp. v. 289 (1810). *S. nodulosa* Desv. Mém. Soc. Linn. Paris, vi. pt. 2, 287 (1827). *S. germanica*, var. *pensylvanica* Lowe, Ferns, Brit. and Exot. ii. 138 (1862).

GRAY HERBARIUM.

THE HEMLOCK SPRUCE.

OLIVER A. FARWELL.

IN RHODORA for March, 1915, Mr. Alfred Rehder published a criticism of my paper on "the correct name of the Hemlock Spruce" which appeared in the issue of the Bulletin of the Torrey Botanical Club for December, 1914. I shall not attempt to answer the salient points of his discussion in the order in which they are given but will take analogous but non-contiguous features, and bring them together in order to show as clearly as possible the inconsistencies and fallacies of his statements and conclusions.

In dealing with specific names and the species which they represent two axioms are in general use. The first is that any species which has had the type specifically mentioned or designated by the author stands or falls with that type; the author's specific name cannot be transferred to another plant. The other is that where the type has

[1] Asch. & Graebn. Syn. i. 43 (1896).

not been specifically mentioned or designated, the first author revising the species must of necessity make his own choice as to which element shall bear the name. That choice should be, and perhaps is, generally, determined by the internal evidence.

Mr. Rehder fails to see wherein my reference to Article 46 of the Vienna Rules bears upon the case at issue since the Article mentioned treats of the combining of two or more species and not of the division of one. The Vienna Rules are general laws for the guidance of such botanists as have subscribed to them. In the treatment of species, the first author revising them is given, under certain conditions, the choice of making his own interpretation as to the application of the specific names and subsequent revisers cannot alter this interpretation. The Vienna Congress in handling this subject relating to the treatment of species first considers the combining of species and it is here that the general law making the author's choice of name, under certain conditions, permanent, is expressed. When considering the division of a species, the Congress, acting upon the basis that "brevity is the soul of wit," declined, and justly so, to perpetrate a needless repetition.

In regard to the detailed description of *Pinus Balsamea* Linnaeus, which Mr. Rehder fails to see is not restrictive, it may be remarked that the leaves of *Tsuga caroliniana*, a species growing in Virginia, may be notched at the end, thus coming under the designation *subemarginatis*. Also that the leaves of *A. Fraseri* may be either emarginate or obtuse. Rehder claims that it had not been discovered at the time *P. Balsamea* was published. It would be more accurate to say that it was not *recognized* at the time as a *distinct species* but there is no evidence to prove that it was not known and included in *Pinus Balsamea*. It must therefore be considered in any discussion of the subject. The leaves of the Balsam Fir from Vermont show an emarginate apex but those from the Lake Superior district have no such markings but are as rounded and as obtuse as the leaves of the Hemlock. The leaves of the Hemlock Spruce are as broad as those of the Balsam Fir so they are *not excluded from consideration* by a comparison of the latter with those of the Silver Fir. The white bands on the under side of the leaves in the Hemlock are usually composed of four rows of stomata but frequently are of five or six and sometimes of seven or eight; those on leaves of the Balsam Fir of Lake Superior are generally of seven or eight rows but are frequently of any number between four and eight inclusive while those on trees from Vermont

from three to eight with six about the general run. It will therefore be seen from the foregoing that the Linnaean detailed description of *Pinus Balsamea* is not only not characteristic, for the leaves may be entire and obtuse and the rows of stomata as low as three, but it is broad enough to include the leaves of what are now considered as four species included under two genera. Not only that but the real characters, found in the cones, upon which the genera and species are separated are not even touched upon by Linnaeus. The Linnaean description may, therefore, mean any one of two or more species and *Pinus Balsamea* Linn., as to the specific name, is the Balsam Fir; as to the description, an undefinable aggregate; and as to the synonyms, the Hemlock Spruce.

Rehder claims that the Gronovian synonym, the Hemlock Spruce, is the type of *Pinus canadensis* Linn. because the Linnaean diagnosis "is taken nearly literally from the synonym of Gronovius." Further on he admits *Abies canadensis* Miller to be a new name for a different species because "Miller does not quote *Pinus canadensis* Linnaeus as a synonym." Miller does not quote the binomial, it is true, but he *does use the Linnaean specific name* and *he does use the Linnaean diagnosis* upon which Rehder lays so much stress and which "is taken nearly literally from the synonym of Gronovius. This shows as clearly as if" Miller "had expressly designated the Gronovian plant as the type of his species, that his" *Abies canadensis* "is based primarily on the plant described by Gronovius." In other words, if the Linnaean diagnosis is the type of *Pinus canadensis* to the exclusion of other matter not conspecific with it, the same must be true of Miller's *Abies canadensis* for the diagnosis and the specific name are the same in each and have the same origin thus making the two binomials synonymous even though Miller did not quote *Pinus canadensis* as a synonym. Rehder, therefore, fails to prove that *Abies canadensis* Miller is different from *Pinus canadensis* Linnaeus. Furthermore, since he insists that the Hemlock Spruce is the type of the latter it must also be the type of the former because the two, according to his own method of reasoning, have been proved to be synonymous. The fallacy is so evident that it needs no comment.

Rehder doubts that Miller intended to transfer the Linnaean species from *Pinus* to *Abies* and that if he actually had such intention he misapplied the name under the laws of priority. The only law of priority that will apply here is the one giving the first author revising

a species the privilege of choosing the specific name under certain conditions — Article 46 which, by inference, covers the division of species as well as the combination of them. *Pinus canadensis* Linn. *is an aggregate without a designated type* consisting of the White Spruce and the Hemlock Spruce. In transferring from *Pinus* to *Abies* Miller separated the two elements retaining the specific name and diagnosis for the White Spruce (the synonym of Miller) and giving a new name *Abies americana* to the Hemlock (the synonym of Gronovius). It is, therefore, very evident that Miller not only knew what he was about but that he intended to transfer the species and that the name was not misapplied since he used it in the sense that Linnaeus did — "*canadensis*" *being indicative of the White Spruce,* as *Balsamea is of the Balsam Fir.* Under the above mentioned Article this choice cannot be changed. As above shown Rehder completely fails to prove that the specific name "*canadensis*" was misapplied by Miller; he admits that *Abies canadensis* is the White Spruce; yet refers the *Pinus canadensis, a synonym,* to the Hemlock Spruce; the fallacy of Rehder's argument is very apparent.

The whole discussion revolves about the determination of a type for *Pinus canadensis* Linnaeus. If it can be shown that Linnaeus actually had the Hemlock Spruce in view for his *P. canadensis* it must be considered the type and in this case it must be admitted that Miller has misapplied the name. But did he? Will Mr. Rehder admit that Miller had the Hemlock in view for his *A. canadensis* because he used the Linnaean diagnosis which "was taken almost literally from the synonym of Gronovius?" Certainly not! Nor any one else! Then why for *P. canadensis?* In the first edition of the Species Plantarum Linnaeus placed two Hemlock synonyms under *P. Balsamea;* in the second edition he admitted another species, *P. canadensis,* to include the White Spruce and one of the synonyms (the more recent) of the Hemlock Spruce leaving the other (the older) where originally placed, under *P. Balsamea.* When Linnaeus used these synonyms he gave them the status of post-Linnaean publications and the older of these in point of actual publication, that of Plukenet, must therefore, under the law of priority, be considered to be the type of the Hemlock Spruce. This did not receive a binomial name until Miller named it *Abies americana.* But what was the incident that induced Linnaeus between 1753 and 1763 to establish a new species in this group of plants? Was it from anything Plukenet or Gronovius had written

during that decade? Most certainly not, for one had been long dead and the other had published nothing *new* upon the subject. It is not probable that a reperusal of the old writings had anything to do with the matter as these had already been thoroughly studied for the first edition; also the fact that the synonyms were separated and placed under two species, to neither of which they belonged, is very conclusive evidence that Linnaeus neither knew the Hemlock Spruce nor had any real conception of its status as a species and therefore could not have considered it a type. What then was the controlling factor in the establishment of *Pinus canadensis?* During the decade above referred to Miller published and described under the old style of nomenclature four species of this group and later illustrated at least one of them, the White Spruce. These publications of Miller brought the species prominently before Linnaeus who readily recognized the claims of the White Spruce to specific rank and, *on the strength of Miller's publications,* accorded it such as *Pinus canadensis* in the second edition of the Species Plantarum. Rehder claims that the specific name in *Pinus Balsamea* is indicative of what Linnaeus meant and furthermore that it shows Linnaeus did not get all his information regarding the Balsam Fir from the Hemlock synonyms cited under it. Does not the same reasoning apply when considering *P. canadensis?* Or will Mr. Rehder deny that it does and insist that Linnaeus obtained the specific name *"canadensis" from the writings of Gronovius on Virginia and the Hemlock Spruce?* The entire internal evidence shows conclusively that Linnaeus had the White Newfoundland Spruce in mind when he published *Pinus canadensis* notwithstanding he drew up his diagnosis from Gronovius, which, under the circumstances, was unfortunate. The proper specific name, therefore, for the Hemlock Spruce is the one first applied to it, that of *americana,* and the correct binomial, *Tsuga americana* (Miller) Farwell.

DEPARTMENT OF BOTANY, PARKE, DAVIS & CO., Detroit, Mich.

REPORTS ON THE FLORA OF THE BOSTON DISTRICT,— XX.

URTICACEAE.

BOEHMERIA.

B. cylindrica (L.) Sw. Wet places, common, but not reported from the southwest.

CANNABIS.

C. SATIVA L. Waste places; occasional, especially around cities.

CELTIS.

C. occidentalis L. Woods and pastures, also on seashore; along the coast from Plum Island to Duxbury, also at Lowell, Lexington, Concord, Lincoln, South Sudbury, and Waltham.

HUMULUS.

H. JAPONICUS Sieb. & Zucc. A Japanese species, escaped in waste places at Salem and Peabody (*J. H. Sears*, Oct. 5, 1904), Weston (according to *M. L. Fernald*), Roxbury (*G. G. Kennedy*, Oct. 9, 1907), and at Scituate (*Edward W. Cushman*).

H. LUPULUS L. Roadsides and waste places, evidently introduced in our territory. Reported from many stations.

LAPORTEA.

L. canadensis (L.) Gaud. Rich woods, rare; Groveland, Boxford, Belmont, Brookline, Natick, Cohasset.

MACLURA.

M. POMIFERA (Raf.) Schneider. Escaped on Page St., Danvers (*G. G. Kennedy*, Aug. 20, 1907). Introduced from the west.

MORUS.

M. ALBA L. Persistent and escaped; reported at twelve scattered stations.

M. RUBRA L. Ipswich, an old tree (*J. Robinson*, Aug. 8, 1876); Cambridge, dump near University Press (*A. S. Pease*, Oct. 12, 1908); occasional roadside escape, Southborough (*A. J. Eames*, July 31, 1910). Native in western New England, also west and south.

PARIETARIA.

P. pennsylvanica Muhl. Swampscott (*J. H. Sears*, July 25, 1885); waste ground, Percival St., Dorchester (*J. R. Churchill*, Sept. 22, 29, 1901); Concord (*Minot Pratt*) according to Dame & Collins, Fl. Middlesex Co. 92, 1888; Hingham according to Bouvé, Botany of Hingham, in History of Hingham, i. pt. 1, 124, 1893.

PILEA.

P. pumila (L.) Gray. Shady places in rich soil, frequent. No reports from southern towns.

ULMUS.

U. americana L. Moist soil, woods, fields and roadsides; common throughout.

U. CAMPESTRIS L. Established in roadside thicket, Danvers (*R. B. Mackintosh*, December, 1903); Medford (*L. L. Dame*, —, 1887; *C. H. Morss*, May 27, 1899); Seaver St., W. Roxbury (*C. W. Swan*, May 29, June 9, 1883); roadside escape, Canton (*G. G. Kennedy*, —, 1891).

U. fulva Michx. Rocky woods, rare; Georgetown, Boxford, Wenham, Bedford, Concord, Brookline, Dorchester. Probably introduced at last station.

U. SCABRA Miller. A small selfsown tree, now extinct, Cambridge (*W. Deane*, June 29, 1895); Dedham (*G. G. Kennedy*, May 24, 1891); roadside, Milton (*G. G. Kennedy*, June 5, 1891). This is the Scotch or wych elm, which ranges from Europe to Japan.

URTICA.

U. DIOICA L. Waste places, rare; Boston, Roxbury, Dorchester, Concord, Watertown, Framingham; Hingham, according to Bouvé, Botany of Hingham, in History of Hingham, i. pt. 1, 124, 1893.

U. gracilis Ait. Moist ground in waste places; common.

U. Lyallii Wats. Moist ground in waste places; numerous reports from central and northern portions of the district.

U. URENS L. Waste ground, infrequent, generally near the coast. Reported from Gloucester, West Gloucester, Andover, Malden, Revere, Boston, Sherborn.

SANTALACEAE.

COMANDRA.

C. umbellata (L.) Nutt. Dry woods and open ground, very common throughout.

LORANTHACEAE.

ARCEUTHOBIUM.

A. pusillum Peck. Parasitic on *Picea mariana*; at a pond near Skug River, Andover (*A. S. Pease*, Oct. 25, 1902); Wilmington (*A. S. Pease*, Oct. 18, 1902); Acton (*J. G. Jack*, May 10, 1898).

ARISTOLOCHIACEAE.

ASARUM.

A. canadense L. Rich woods and roadsides, infrequent. Probably introduced at most of its stations.

POLYGONACEAE.

EMEX.

E. SPINOSA Campd. Charlestown (*C. E. Perkins*, 1882, specimen in herb. N. E. Botanical Club). Native of Mediterranean region, Cape of Good Hope and the Antilles.

FAGOPYRUM.

F. ESCULENTUM Moench. Persistent after cultivation and escaping, frequent.

F. TATARICUM (L.) Gaertn. In similar situations; Nahant, Somerville, Cambridge, Dedham, Sherborn.

POLYGONELLA.

P. articulata (L.) Meisn. Dry sand and gravel, very common throughout.

POLYGONUM.

P. acre HBK. Wet soil, very common throughout.

P. acre HBK., var. **leptostachyum** Meisn. Well distributed throughout.

P. amphibium L. Ponds and shallow water. Apparently rather frequent in Essex County, also at Glacialis Pond, Cambridge (*G. G. Kennedy*, June 26, 1863); Framingham (*A. J. Eames*, Sept. 20, 1908).

P. amphibium L., f. **Hartwrightii** (Gray) Blake. (See RHODORA xv. 164, 1913.) Muddy shores, Chelmsford, Cambridge, W. Roxbury, Woburn, Sherborn.

P. amphibium L., f. **terrestre** (Leers) Blake. (See RHODORA xv. 164, 1913.) On Newburyport turnpike, Ipswich (*John A. Lowell*, no date); on shore near type in W. P. Upham's pond, Peabody (*J. Robinson*, July 30, 1874); Fresh Pond, Cambridge (*W. G. Farlow*, September, 1878).

P. ARENARIUM Waldst. & Kit. Vacant land, Back Bay, Boston (*W. P. Rich*, July 18, 1906); South Boston flats (*W. P. Rich*, July, 1899). See RHODORA x. 152, 1908. Native of southern Europe, extensively used in California for rockeries and bouquets.

P. arifolium L. Meadows, ditches and low woods; common throughout.

P. aviculare L. Dooryards, sidewalks and waste places; very common throughout.

P. aviculare L., var. **angustifolium** Meisn. Gravelly soil, Back Bay Fens (*A. S. Pease*, Oct. 9, 1906); waste ground, Dorchester (*J. R. Churchill*, Oct. 20, 1894).

P. aviculare L., var. **littorale** (Link) Koch. Edge of salt marshes; Revere, Chelsea, South Boston, Scituate and probably elsewhere on the coast.

P. aviculare L., var. **vegetum** Ledeb. Oak Island, Revere (*H. A. Young*, Aug. 3, 1882; *G. G. Kennedy*, Aug. 6, 1894); Boston (*C. E. Perkins*, June 12, 1879); chicken-yard, Sherborn (*M. L. Loomis*, July 15, 1912, July 25, 1913).

P. Bellardi All. S. Boston (*E. & C. E. Faxon*, July 3, 1879). Adventive from western Asia or eastern Europe.

P. Bistorta L. Garden escape, Boxford (*Rev. W. P. Alcott*, June 13, 1890); weed in garden, Malden (*W. H. Manning*, —, 1883; *Mrs. N. M. Hunnewell*, May 31, 1886). A boreal species, native of Eurasia and western North America.

P. Careyi Olney. Swamps and moist places, frequent. No reports from Plymouth County.

P. cilinode Michx. Dry ledges and clearings; occasional, especially on Cape Ann.

P. Convolvulus L. Gardens and waste places; common.

P. cuspidatum Sieb. & Zucc. Waste places; recently introduced, and especially frequent in Boston and immediate vicinity; also at Danvers, Wakefield, and Lexington.

P. dumetorum L. Rich soil; reported from only eight stations, but probably much more common than this would indicate.

P. dumetorum L., f. **cristatum** (Engelm. & Gray) Robinson. Blue Hills, W. Quincy, common (*J. R. Churchill*, Aug. 29, 1891).

P. erectum L. Fields and waste places; occasional in central and northern towns.

P. exsertum Small. Brackish meadows and salt marshes; Ipswich, Cambridge, Boston, Brighton.

P. glaucum Nutt. (See Rhodora xv. 68–73, 1913.) Revere (*C. E. Faxon*, no date; the specimen is in the Gray Herbarium). The specimens quoted by John Robinson, Fl. Essex Co. 92, 1880 as *P. maritimum* L. although some are immature, seem to be *P. prolificum* (Small) Robinson.

P. Hydropiper L. Moist soil, very common throughout.

P. hydropiperoides Michx. Brooks and swamps; common throughout.

P. hydropiperoides Michx., var. **strigosum** Small. Wayland, Wellesley, Dedham, Milton, Canton.

P. lapathifolium L. Fields, gardens and waste places, common.

P. lapathifolium L., var. **incanum** (Willd.) Koch. Stony and gravelly shores and wet places; Spot Pond, Stoneham; Winter Pond and North Reservoir, Winchester; dump, Boston; flats, South Boston; low cultivated ground, Sherborn.

Specimens from all these places have been carefully examined. They have the small achenes of *P. lapathifolium* L. and should be referred to the above variety rather than as a variety to *P. tomentosum* Schrank.

P. lapathifolium L., var. **nodosum** (Pers.) Weinmann. Cultivated ground, Sherborn (*M. L. Loomis*, Aug. 2, 1910 et seq.).

P. Muhlenbergii (Meisn.) Wats. Muddy places and shallow water, occasional.

P. ORIENTALE L. Garden escape; occasional.

P. pennsylvanicum L. Moist soil, common throughout.

P. PERSICARIA L. Waste places and gardens, very common throughout.

P. prolificum (Small) Robinson. Salt marshes and beaches; common along the coast.

P. ramosissimum Michx. Salt marshes, Watertown (*F. S. Collins*, July 28, 1886); waif in dry sand by railway, Belmont (*C. H. Knowlton*, Aug. 26, 1911).

P. ramosissimum Michx., f. **atlanticum** Robinson. Medford, Cambridge, Watertown, Dorchester, Scituate. A peculiar form from Oak Island, Revere, somewhat resembling *P. erectum* probably belongs here.

P. RURIVAGUM Jord. Watertown (*C. E. Perkins*, Aug. 25, 1881). An Old World species.

P. sagittatum L. Low grounds, very common and abundant throughout.

P. scandens L. Swamps and wet thickets, common.

P. tenue Michx. Dry rocky and sandy places, frequent.

P. virginianum L. Moist shady places; Lexington; Beaver Brook Reservation, Belmont; Stony Brook Reservation in W. Roxbury and Hyde Park.

RHEUM.

R. RHAPONTICUM L. Open field, Beaver Brook Reservation, Belmont (*W. Deane*, Apr. 25, 1896). Frequently persistent after cultivation, but seldom collected. Originally from southern Siberia.

RUMEX.

R. Acetosa L. Roadsides, Georgetown (*J. H. Sears*, June 12, 1905); Medfield (*K. M. Wiegand*, June 23, 1909).

R. Acetosella L. Dry fields, especially in acid soil; very common and abundant throughout. Noticed near Salem in 1628 by Francis Higginson.

R. altissimus Wood. Near Audubon Road, Boston (*C. W. Swan*, Aug. 25, 1899); vacant lot, Fenway, Boston (*C. H. Knowlton*, June 25, 1908). Adventive from the West.

R. Britannica L. Swamps and marshes, frequent throughout.

R. crispus L. Fields and waste places; a common weed throughout.

R. hastatulus Baldw. Salisbury beach (*A. A. Eaton*, Aug. 31, 1912, specimen in Gray Herb.).

R. maritimus L., var. **fueginus** (Phil.) Dusén. (See Rhodora xvii. 73–83, 1915.) Charlestown (*C. E. Perkins*, July or August, 1881); South Boston flats (*C. E. Perkins*, July 10, 1879).

R. mexicanus Meisn. Low waste ground near Cottage Farm, Brighton (*F. F. Forbes*, June 23, 1912).

R. obtusifolius L. Fields and waste places, common throughout.

R. pallidus Bigel. Sea beaches and salt marshes, frequent along the coast.

R. Patientia L. Moist thickets and waste places; Andover, Manchester, Wakefield, Weston, Wellesley, Framingham, Sherborn, Hingham.

R. persicarioides L. Sandy Cove, Bayview, Gloucester (*W. P. Rich & E. F. Williams*, Aug. 15, 1897 and *M. L. Fernald, F. W. Hunnewell & B. Long*, September 11, 1913).

R. verticillatus L. Cohasset (*Miss Lincoln*, no date; specimen in herb. Boston Soc. Nat. Hist.). Adventive from further west.

[*Chorizanthe pungens* Benth. N. Chelmsford, wool-waste (*Rev. W. P. Alcott*; specimen in herb. of), adventive from California, according to Dame & Collins, Fl. Middlesex Co. 88, 1888. Mr. Alcott seems to have been a keen observer, but the committee has been unable to locate his herbarium.]

CHENOPODIACEAE.

ATRIPLEX.

A. arenaria Nutt. Edges of salt marshes and seashore; Salisbury, Plum Island, Beverly, Lynn, and in nearly every coastal town or city from Cambridge to Duxbury.

["*A. bracteosa* Wats. N. Chelmsford, wool-waste (Rev. W. P. Alcott). Adv. from Cal.", according to Dame & Collins, Fl. Middlesex Co. 84, 1888.]

A. patula L. Salt marshes and waste places near the coast, rather common.

A. patula L., var. **hastata** (L.) Gray. Common and abundant, with the typical form.

A. patula L., var. **littoralis** (L.) Gray. Frequent, with the typical form.

A. ROSEA L. South Boston flats (*C. E. Perkins*, Aug. 9, 1879; Sept. 5, 1881; specimens in herb. N. E. Botanical Club).

BASSIA.

B. HIRSUTA (L.) Aschers. Made land near sea, South Boston (*C. H. Knowlton*, Sept. 12, 1908 et seq.). A large area is fully occupied by this saline species. (See RHODORA xi. 120, 1909.) Also on wool-waste at Westford (*Miss E. F. Fletcher*, October, 1910).

CHENOPODIUM.

C. ALBUM L. Common weed in waste places and gardens everywhere.

C. ALBUM L., var. VIRIDE (L.) Moq. Frequent, with the typical form.

C. AMBROSIOIDES L. Waste places; very abundant around cities, frequent elsewhere.

C. AMBROSIOIDES L., var. ANTHELMINTICUM (L.) Gray. Occasional in waste places.

C. BONUS-HENRICUS L. Roadside next Botanical Garden, Cambridge, no date; Back Bay, Boston (*Miss F. C. Prince*, no date).

C. BOSCIANUM Moq. Vacant lot, Back Bay, Boston (*W. P.*

Rich, Aug. 27, 1900; specimen in herb. W. P. Rich). Adventive from west or south.

C. Botrys L. Waste places and gardens, frequent.

C. capitatum (L.) Aschers. Waste places rare; Salem, Lowell, Sherborn, Hingham. Adventive from further west.

C. glaucum L. Gardens and waste places; frequent near Boston, occasional elsewhere.

C. graveolens Lag. & Rodr. Turnip patch, dressed with wool-waste, Chelmsford (*C. W. Swan*, Sept. 20, 1885; specimen in herb. Yale University and herb. N. E. Botanical Club). A native of the American tropics from Mexico to Bolivia; also in tropical Africa and Arabia.

C. hybridum L. Dry open woods (its original habitat) and waste places, common throughout.

C. leptophyllum Nutt. Sand dunes, beaches and borders of salt marshes; Plum Island, Revere, Dorchester and perhaps elsewhere; also adventive at Sherborn (*M. L. Loomis*, Aug. 3, 1911; July 23, 1912).

C. multifidum L. South Boston flats (*C. E. Perkins*, 1881; specimen in herb. N. E. Botanical Club). Native of South America.

C. murale L. Waste land; Newburyport, Charlestown, Roxbury, Dorchester; Tewksbury and Framingham, according to Dame & Collins, Fl. Middlesex Co. 83, 1888.

[*C. polyspermum* L. Framingham (*Rev. J. H. Temple*), according to Dame & Collins, Fl. Middlesex Co., 83, 1888.]

C. rubrum L. Salt marshes; Rockport, Gloucester, Revere, Medford, Quincy. "'Near the mouth of Saugus river' (Dr. Chas. Pickering) 'Annisquam' (Mrs. Downs).", according to Robinson, Fl. Essex Co. 90, 1880.

C. urbicum L. Waste places, occasional. Collected on Boston Common by E. Tuckerman, Jr., in July, 1843.

C. virgatum Thunb. Bond St., Cambridge (*Roger Warner*, June 28, 1885; specimen in herb. W. Deane). Native of Japan.

KOCHIA.

K. Scoparia (L.) Schrad. Roadside in old town and abundant in gardens at Marblehead (*W. Deane*, Aug. 30, 1911); dump on vacant lot, Fenway, Boston (*C. H. Knowlton*, Aug. 6, 1911).

SALICORNIA.

S. ambigua Michx. Salt marshes and wet sea-beaches. Rare on North shore; Annisquam, Gloucester (*J. H. Sears*, 1892); Lynn (*J. Robinson*, Sept. 14, 1875); Revere (*C. H. Knowlton*, Aug. 20, 1908). "At Gloucester, Mass. Pickering. 1825." William Oakes in Hovey's Magazine xiii. 219, 1847. Frequent from Hingham to Plymouth.

S. europaea L. Salt marshes, common throughout.

S. europaea L., var. **pachystachya** (Koch) Fernald. Nahant (*K. M. Wiegand*, Oct. 2, 1908; specimen in herb. Wellesley College).

S. mucronata Bigel. Salt marshes, frequent.

SALSOLA.

S. Kali L. Sea-beaches, occasional.

S. Kali L., var. **caroliniana** (Walt.) Nutt. More abundant than the typical form.

S. Kali L., var. TENUIFOLIA G. F. W. Mey. Gardens and waste places; occasional, but apparently not spreading.

SPINACIA.

S. OLERACEA L. Rubbish heap, Winchester (*M. L. Fernald*, May 26, 1907).

SUAEDA.

S. linearis (Ell.) Moq. Salt marshes, common throughout.

S. maritima (L.) Dumort. Salt marshes, frequent throughout.

S. Richii Fernald. Prostrate in sand below high tide, and in salt marshes; Plum Island (*E. F. Williams*, Aug. 4, 1899); Ipswich (*J. H. Sears*, Aug. 24, 1886; September, 1887); Bass Rocks, Gloucester (*E. F. Williams*, Aug. 14, 1898).

AMARANTHACEAE.

ACNIDA.

A. cannabina L. Edges of clayey tidal estuaries, from Newburyport to Dorchester; not reported on the South Shore, probably because the shores are sandy.

A. TAMARISCINA (Nutt.) Wood. Introduced in waste, Goulding's Mill, Malden (*F. S. Collins,* Sept. 25, 1887; specimen in herb. Gray). Adventive from the west.

A. tuberculata Moq. Roadside, Medford (*F. S. Collins,* August, 1887; in Dame & Collins, Fl. Middlesex Co. 86, 1888 as *A. rhyssocarpa* Moq.); along the river, Concord (*E. F. Williams,* Sept. 17, 1879); abandoned chicken-yard, Sherborn (*M. L. Loomis,* Oct. 18, 1913).

AMARANTHUS.

A. BLITOIDES Wats. Waste sandy ground, frequent. Adventive from the west.

A. CAUDATUS L. Waste places; W. Chelmsford, Lynn, Wakefield, Woburn, Cambridge. An Old World species, spreading from the American tropics.

[Rev. Manasseh Cutler, writing from Ipswich in 1784, reported the Bloody Amaranth or Love Lies Bleeding as growing "amongst rubbish" (Mem. Am. Acad. i. 490, 1785). Robinson's Flora of Essex Co., 91, 1880, identifies Cutler's plant with the above.]

A. CRUENTUS L. Gardens and waste places; Medford (*Wm. Boott,* 1863–4); Cambridge (*A. Gray,* 1876); S. Boston (*E. F. Williams,* Sept. 18, 1898). An Old World species.

A. GRACILIS Desf. S. Boston (*E. & C. E. Faxon,* 1878; specimen in herb. N. E. Botanical Club). An Old World species.

A. graecizans L. Waste places and gardens, common.

A. HYBRIDUS L. Waste and cultivated ground, common.

A. HYBRIDUS L., f. HYPOCHONDRIACUS (L.) Robinson. Rare weed in gardens, Framingham (*A. J. Eames,* Sept. 13, 1914; Concord, persistent for four years on a dump (*A. W. Hosmer,* RHODORA i. 224, 1899).

A. PALMERI Wats. Cotton mill waste, Goulding's Mill, Malden (*F. S. Collins,* Sept. 25, 1887 et seq.); S. Lawrence (*A. S. Pease,* Sept. 23, 1902). Adventive from the west.

A. PANICULATUS L. Waste places, infrequent.

A. POWELLII Wats. Weed in cultivated ground, Tewksbury (*E. F. Williams & W. P. Rich,* Aug. 12, 1900); Weston, roadside (*E. F. Williams,* Sept. 5, 1897). Fugitive from western United States.

A. RETROFLEXUS L. Cultivated ground and waste places, common throughout.

A. SPINOSUS L. Waste places; Lowell, Lynn, Malden, Boston, South Boston.

A. VIRIDIS L. Goulding's Mill, Malden (*F. S. Collins*, Aug. 30, 1887); dump, South Boston (*E. & C. E. Faxon*, 1878).

GOMPHRENA.

G. GLOBOSA L. Dump, Boston (*C. W. Swan*, Sept. 14, 1886; specimen in herb. Yale University).

PHYTOLACCACEAE.

PHYTOLACCA.

P. americana L. (L. Sp. ed. 1. *P. decandra* L. Sp. ed. 2.) Dry pastures, open woods and roadsides; common throughout.

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